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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,358	07/14/2005	Yasuaki Yokoyama	273117US0PCT	2848
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
SHEVIN, MARK L				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/542,358

Applicant(s)

YOKOYAMA ET AL.

Examiner

Mark L. Shevin

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- Paper No(s)/Mail Date 07/14/2005 and 09/27/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Status

1. Claims 1-5, in the preliminary amendment filed July 14th 2005, are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 1-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hiroomi** (JP 2002-175,983) in view of **Furasawa** (EP 1,085,579) and **Jones** (GB 2,248,853).

Hiroomi is drawn to a process of manufacturing components for a silicon photoelectric converter (solar cell) including forming an Al-Si thin film on a substrate (Abstract).

Hiroomi simultaneously deposits Al and Si on a substrate to form an Al-Si film (para 0011). Hiroomi recites a number of vapor deposition methods useful for forming such a film such as sputtering, vacuum deposition, and ion plating (para 0017). Hiroomi

teaches a composition of mixed aluminum and silicon material in element **108** (page 26 of 27). Hiroomi, however, does not teach compositions comprising compounds of silicon and aluminum together nor liquid compositions cured by heat and/or light.

Furasawa is drawn to the production of a solar cell (para 0001). The object of his invention is to produce thin films of silicon, necessary to the manufacture of solar cells, by coating the surface with a composition containing a silane compound and then exposing the surface later to heat, light, or laser treatment (para 0010). Another object of the invention is to provide a method of manufacturing thin films other than silicon films by coating liquid materials followed by heating (para 0010). Thus Furasawa teaches a liquid silane compound for the simple coating of a substrate with silicon.

Jones is drawn to a method of coating a substrate with aluminum by depositing a solution of alane (AlH_3) amine adduct which is subsequently thermally decomposed on the substrate (Abstract). The solution of aluminum compound may be deposited on the substrate in any suitable way and then thermally decomposed to form an even coating of aluminum on the substrate (p. 4, lines 3-14).

Regarding claim 1, it would have been obvious to one of ordinary skill in the metal deposition arts, at the time the invention was made, taking the disclosures of Hiroomi, Furasawa, and Jones as a whole, to combine Hiroomi in view of Furasawa and Jones to create a composition for forming a silicon-aluminum film. This is because Hiroomi taught the desirability of forming an Al-Si film in the context of forming solar cells (para 0011) and Furasawa then teaches that silicon can be deposited in a more efficient manner than the CVD processes of Hiroomi (para 0002-0004; 0080). One

would be motivated to modify Hiroomi by using the liquid silane composition of Furasawa to use a more efficient way of obtaining silicon in the Al-Si layer as Furasawa explicitly suggested his method as superior in cost effectiveness and efficiency to CVD processes (para 0002—0004; 0080). Given the disclosure of Furasawa in teaching how a liquid composition of a decomposable organometallic moiety is more efficient compared to CVD and forms a thin metal layer, one would then look to a method of obtaining the Al component of the Al-Si film and Jones then teaches a liquid solution of amine - aluminum hydride complex (Abstract) useful in depositing a thin film of aluminum. All three references are drawn to methods of metallizing surfaces. One would thus be motivated to form a composition comprising a silicon compound and an aluminum compound for forming an Al-Si film as Hiroomi taught the desirability of an Al-Si film, Furasawa taught the efficiency and flexibility of solution phase metal deposition for Si, and Jones then taught the solution phase deposition of the other component, Al.

Regarding claim 2, Furasawa teaches that the silicon compound of his invention as Si_nX_m where n is an integer of 5 or more, and m may be n , $2n-2$, or $2n$. Thus Furasawa teaches silicon compounds of the form: Si_bX_{2b} and Si_cX_c where b and c are 5 or more.

Regarding claim 3, Jones teaches the aluminum compound of his invention is an alane (aluminum hydride, AlH_3) adduct with a triamine (p. 2, lines 22-26) which is a complex of an amine compound and aluminum hydride. Amine compounds include trimethylamine, bis-(trimethylamine), and dimethylethylamine (p. 3, lines 1-4).

Regarding claims 4 and 5, the silicon compound of Furasawa can be deposited on the substrate by multiple methods including spin coating, roll coating, curtain coating, dip coating, spray coating, inkjet printing, or similar methods (para 0043). The liquid is converted to a solid film of silicon by heating and or light irradiation (para 0044). Similarly, Jones teaches that his aluminum compound can be deposited on the substrate in any suitable way onto a heated substrate to decompose the compound to form the aluminum film. Even though Jones does not teach heating the solution after deposition, one of ordinary skill would infer from Jones that the alane amine adduct aluminum compound forms a film after heating to above about 100°C (claim 3) and thus one could modify Jones by altering the timing of heating to after deposition to better mesh with the solution deposition and decomposition method of Furasawa to form an alloyed Al-Si film.

Conclusion

-- Claims 1-5 (All pending) are rejected
-- No claims are allowed

3. The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

10-542,358
March 4th, 2008